

## British Thermal Unit Conversion Factors

The thermal conversion factors presented in the following tables can be used to estimate the heat content in British thermal units (Btu) of a given amount of energy measured in physical units, such as barrels or cubic feet. For example, 10 barrels of asphalt has a heat content of approximately 66.36 million Btu (10 barrels x 6.636 million Btu per barrel = 66.36 million Btu).

The heat content rates (i.e., thermal conversion factors) provided in this section represent the gross (or higher or upper) energy content of the fuels. Gross heat content rates are applied in all Btu calculations for the *Monthly Energy Review* and are commonly used in energy calculations in the United States; net (or lower) heat content rates are typically used in European energy calculations. The difference between the two rates is the amount of energy that is consumed to vaporize water that is created during the combustion process. Generally, the difference ranges from 2% to 10%, depending on the specific fuel and its hydrogen content. Some fuels, such as unseasoned wood, can be more than 40% different in their gross and net heat content rates. See "Heat Content" and "British Thermal Unit (Btu)" in the Glossary for more information.

In general, the annual thermal conversion factors presented in Tables A2 through A6 are computed from final annual data or from the best available data and labeled "preliminary." Often, the current year's factors are labeled "estimate," and are set equal to the previous year's values until data become available to calculate the factors. The source of each factor is described in the section entitled "Thermal Conversion Factor Source Documentation," which follows Table A6 in this appendix.

**Table A1. Approximate Heat Content of Petroleum and Biofuels**  
(Million Btu per Barrel, Except as Noted)

| Commodity                                     | Heat Content       | Commodity                                      | Heat Content       |
|---|--------------------|--|--------------------|
| Asphalt and Road Oil                          | 6.636              | Motor Gasoline (Finished)—see Tables A2 and A3 |                    |
| Aviation Gasoline (Finished)                  | 5.048              | Motor Gasoline Blending Components (MGBC)      |                    |
| Aviation Gasoline Blending Components         | 5.048              | Through 2006                                   | 5.253              |
| Crude Oil—see Table A2                        |                    | Beginning in 2007                              | 5.222              |
| Distillate Fuel Oil—see Table A3 for averages |                    | Oxygenates (excluding Fuel Ethanol)            | 4.247              |
| 15 ppm sulfur and under                       | 5.770              | Petrochemical Feedstocks                       |                    |
| Greater than 15 ppm to 500 ppm sulfur         | 5.817              | Naphtha Less Than 401°F                        | 5.248              |
| Greater than 500 ppm sulfur                   | 5.825              | Other Oils Equal to or Greater Than 401°F      | 5.825              |
| Hydrocarbon Gas Liquids                       |                    | Petroleum Coke—see Table A3 for averages       |                    |
| Natural Gas Liquids                           |                    | Total, through 2003                            | 6.024              |
| Ethane  | 2.783              | Catalyst, beginning in 2004                    | <sup>a</sup> 6.287 |
| Propane                                       | 3.841              | Marketable, beginning in 2004                  | 5.719              |
| Normal Butane                                 | 4.353              | Residual Fuel Oil                              | 6.287              |
| Isobutane                                     | 4.183              | Special Naphthas                               | 5.248              |
| Natural Gasoline (Pentanes Plus)              | 4.638              | Still Gas                                      |                    |
| Refinery Olefins                              |                    | Through 2015                                   | <sup>b</sup> 6.000 |
| Ethylene                                      | 2.436              | Beginning in 2016                              | <sup>a</sup> 6.287 |
| Propylene                                     | 3.835              | Unfinished Oils                                | 5.825              |
| Butylene                                      | 4.377              | Waxes  | 5.537              |
| Isobutylene                                   | 4.355              | Miscellaneous Products                         | 5.796              |
| Hydrogen                                      | <sup>c</sup> 6.287 | Other Hydrocarbons                             | 5.825              |
| Jet Fuel, Kerosene Type                       | 5.670              | Biofuels, Fuel Ethanol—see Table A3            |                    |
| Jet Fuel, Naphtha Type                        | 5.355              | Biofuels, Biodiesel                            | 5.359              |
| Kerosene                                      | 5.670              | Biofuels, Renewable Diesel Fuel                | 5.494              |
| Lubricants                                    | 6.065              | Biofuels, Other                                | 5.359              |

<sup>a</sup> Per residual fuel oil equivalent barrel (6.287 million Btu per barrel).

<sup>b</sup> Per fuel oil equivalent barrel (6.000 million Btu per barrel).

<sup>c</sup> Hydrogen has a gross heat content of 323.6 Btu per standard cubic foot (at 60 degrees Fahrenheit and 1 atmosphere), and 6.287 million Btu per residual fuel oil equivalent barrel. For hydrogen, barrels can be converted to standard cubic feet by multiplying by 19,426 standard cubic feet per barrel of residual fuel oil equivalent.

Note: The values in this table are for gross heat contents. See "Heat Content" in Glossary.

Web Page: <http://www.eia.gov/totalenergy/data/monthly/#appendices>.

Sources: See "Thermal Conversion Factor Source Documentation," which follows Table A6.